

MARITIME HERITAGE MINNESOTA



Ann Merriman
Christopher Olson

White Bear Lake Nautical Archaeology 1 Project Report



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Acknowledgments

Maritime Heritage Minnesota (MHM) thanks the People of Minnesota for their support of the Minnesota Historical and Cultural Heritage Grant program, part of the Arts and Cultural Heritage Fund of the Clean Water, Land and Legacy Amendment; without the MHCH Grant MHM received to conduct this project, the work would not have been undertaken. MHM would also like to acknowledge the Grants Office staff at the Minnesota Historical Society for their assistance and we thank Scott Anfinson and Bruce Koenen of the Office of the State Archaeologist for their efforts. MHM also recognized the efforts of John Nordby, Lisa Kruse, and Keegan Lund of the Department of Natural Resources. We also thank Sara Markoe Hanson of the White Bear Lake Area Historical Society for her assistance in locating a key resource that greatly enhanced the outcome of this project. MHM acknowledges the help of Mike and Mary Parenteau and Fred Espe who provided us with substantial information that greatly improved our research efforts. This project could not have been completed in a timely fashion without the consideration of an anonymous donor who allowed MHM to use their dock throughout the project; their support of MHM's Mission is greatly appreciated. MHM's volunteer Mark Slick was able to assist MHM every day while in the field, and volunteer Kelly Nehowig was able to come out one day. MHM thanks these talented and ethical men for their time and skill, including video footage editing. Finally, MHM thanks our Board of Trustees Mike Kramer, Deb Handschin, and Steve Hack for their continual support.

Cover: Judge's Boat Wreck, 21-WA-113 (courtesy James Warner through the White Bear Area Historical Society); Sonar image of the Judge's Boat Wreck (by MHM).



MINNESOTA HISTORICAL &
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PRESERVATION OF MINNESOTA'S FINITE NAUTICAL AND MARITIME CULTURAL RESOURCES

Introduction

Shipwrecks and the artifacts associated with them tell a story. Removing or otherwise disturbing artifacts, treating them as commodities that can be sold, obliterates that story. Nautical archaeological and maritime sites are finite and are significant submerged cultural resources. Nautical, maritime, underwater, maritime terrestrial – MHM deals with all of these types of sites throughout the State of Minnesota. MHM's mission is to document, conserve, preserve, and when necessary, excavate these finite cultural resources where the welfare of the artifact is paramount. MHM is concerned with protecting our underwater and maritime sites – our shared Maritime History – for their own benefit in order for all Minnesotans to gain the knowledge that can be obtained through their study. MHM's study of wrecks does not include the removal of artifacts or damaging the sites in any way. MHM does not raise wrecks and does not advocate the raising of a wreck without a complete archaeological documentation sanctioned by the Minnesota Office of the State Archaeologist (OSA) and the extensive amount of funds in hand for such an excavation. Lastly, MHM does not 'hunt' for 'treasure'.

In this vein, MHM does not advocate the 'tagging' of submerged cultural resources in order to 'claim' them; this is a form of graffiti. If a sport diver locates a wreck or submerged cultural resource, the ethical and recommended action is to inform the OSA of the find. Further, often divers will fasten a line with a float attached to a wreck as a submerged buoy. MHM, in theory, is not against this action if the wreck is not harmed by the line and buoy. However, as an organization, MHM recognizes no real purpose for the buoys and does not use them.

Submerged archaeological sites in Minnesota are subject to the same State statutes as terrestrial sites: the Minnesota Field Archaeology Act (1963), Minnesota Historic Sites Act (1965), the Minnesota Historic District Act (1971), and the Minnesota Private Cemeteries Act (1976) if human remains are associated with a submerged site. Further, the case of *State v. Bollenbach* (1954) and the Federal Abandoned Shipwrecks Act of 1987 provide additional jurisdictional considerations when determining State oversight and ownership of resources defined by law as archaeological sites (Marken, Ollendorf, Nunnally, and Anfinson 1997, 3-4). Therefore, just like terrestrial archaeologists working for the State or with contract firms, underwater archaeologists are required to have the necessary education, appropriate credentials, and hold valid licenses from the OSA.

Preface

MHM completed a side and down-imaging sonar survey of White Bear Lake in August 2012 – the White Bear Lake Survey Project (WBLS)¹. Prior to MHM's comprehensive survey, there were no recognized nautical archaeological sites on the lake bottom. The White Bear Lake Nautical Archaeology 1 Project (WBLNA-1) was designed to investigate 22 anomalies on the lake bottom, four of which MHM was confident were wrecks in consideration of their sonar images. However, the fieldwork portion of the project went more quickly than expected and MHM examined 26 instead of 22

¹See MHM's *White Bear Lake Survey Project Report* for a comprehensive maritime history of White Bear Lake.

anomalies from mid-August to early September 2014 using SCUBA. MHM was able to return to newly identified submerged cultural resources after their initial examination to record more data and answer archaeological questions about them that arose during the first dive. These return dives were possible because MHM's research boat used less fuel and the first round of 26 dives took less time than initially anticipated. MHM also began a sediment study of White Bear Lake in order to establish a baseline for comparison of the silt accumulation on different sites. Bruce Koenen of the OSA suggested this type of study during MHM's fieldwork in Lake Minnetonka in order to establish the rate of sediment build-up in different areas of the lake to assist in determining site formation dates. Conducting the same type of study in White Bear Lake will have the same outcome and aid MHM in future research at the lake. This data could then be used to approximate the sinking dates of boats and other resources, using wrecks with known sinking dates for comparison. The data gathered has proven useful and the study will continue into the future.



A 1908 plat map of the White Bear Lake area (Fowble and Fitz, 1908, housed at the White Bear Lake Area Historical Society, digitized by MHM).

Results of the White Bear Lake Nautical Archaeology 1 Project

Research Design

The purpose of the WBLNA-1 Project was to determine the nature of specific anomalies and to begin the sediment build-up study. MHM determined which anomalies would be investigated from an analysis of sonar data. The acoustical signatures of these anomalies suggested to MHM that they were submerged cultural resources. The 26 anomalies examined were 2, 5, 9, 10, 12, 14, 22, 23, 25, 28, 29, 31, 32, 33, 34, 35, 44, 45, 45.1, 46, 47, 50, 51, 52, 53 and 55. Using data accumulated from the fieldwork as a starting point, MHM conducted research to place newly recognized nautical archaeological sites and anomalies in their historical contexts. Minnesota Archaeological Site Forms were filed with the OSA when appropriate and ultimately, all data collected during the WBLNA-1 Project will be utilized during successive projects so the maritime history and nautical archaeology of White Bear Lake will combine to tell a coherent story.

Methodology

The methodology used to identify and rudimentarily document underwater archaeological anomalies is straightforward. MHM used the GPS coordinates of an anomaly (data produced during the WBLS Project) to drop a weighted diver down buoy near the target. Then the dive boat anchored a short distance away from the buoy and divers geared up for the dive. At any given time, there were two or three divers underwater. If the buoy anchor weight landed near and sometimes on the anomaly or wreck, no search for the target was conducted. However, for a variety of reasons, a brief search for the target was conducted until it was located or it was determined that the anomaly was a false sonar return. If a cultural resource was located, the divers photographed and recorded video of the site, recorded its basic measurements, examined any obvious attributes, and measured sediment build-up if appropriate. The order that MHM investigated the prioritized list of anomalies was flexible to accommodate the availability of volunteer divers and the depth of the anomaly or wreck.

Zebra Mussels

The officers of the Department of Natural Resources (DNR) must be commended for their diligence in trying to prevent zebra mussel infestation of White Bear Lake. MHM's research boat was required to undergo an intensive power wash, administered by DNR officers at William O'Brien State Park, prior to her launching for the WBLNA-1 Project. MHM's boat had spent 4 months on Lake Minnetonka (taking part in another nautical archaeology project) and in that time, the chances of small zebra mussels adhering to the hull is high. MHM, after pulling the boat from Lake Minnetonka in early August, cleaned the vessel extensively and left her drying on land for three days, what we thought was the proper procedure. However, the DNR requires a 5-day interval on land and when we arrived to launch the boat on White Bear Lake, the DNR officer on duty required (rightly) that we power wash the boat to insure the removal of any larval zebra

mussels that could not be seen. The DNR officers who conducted the power wash were thorough and professional – and have MHM's gratitude. However, in late September it was reported that zebra mussels have been found in White Bear Lake, concentrated in one area. MHM contacted the DNR to offer the department all of MHM's pertinent data relating to the 26 dive sites visited during the WBLNA-1 Project. The data was welcomed by the DNR and will be used as a baseline for future investigations in relation to the spread of the mussels – if they do indeed spread (Lisa Kruse and Keegan Lund, personal communication, September 29, 2014). MHM is positive that none of the dive sites – those that contained submerged cultural resources, natural formations such as rocks, or were false targets – contained zebra mussels. This fact, at least, is good news. Hopefully the DNR can contain the spread of the mussels and eradicate them from the lake soon. One treatment using liquid potash² has proven effective for a recent zebra mussel infestation in a lake harbor in Manitoba with no apparent adverse effects on the ecosystem (Puxley 2014). MHM suspects the potash would eventually settle out of the water column onto the lake bottom like any other sediment and in the process, kill any zebra mussels that came in contact with the substance.

Sediment Build-Up Study

Prior to the beginning of the WBLNA-1 Project, no studies had been conducted in the lake with the purpose of determining the rate of sediment build-up in different areas of the lake bottom and describing that accumulation for the purposes of archaeological study. A recent United States Geological Survey (USGS) project³ concerned with the consistently low water levels of the lake was designed "to characterize groundwater and surface-water interactions near White Bear Lake through 2011". Although this study concerns hydrology⁴ and not archaeology, the basic conclusion that "lakes with small watersheds, such as White Bear Lake, tend to have lower rates of sediment accumulation than lakes with larger watersheds" (Jones et al 2013, 1, 59) like Lake Minnetonka. During the WBLNA-1 Project, MHM encountered a hard bottom comprised of compacted sand and gravel in one area of the lake only. However, two other sections had hard bottom of compacted sand without the gravel. All other areas of the lake where MHM investigated anomalies were medium soft to very soft with thick layers of sediment build-up that, once disturbed, would clear at different rates.

Results

After the completion of the WBLNA-1 Project fieldwork in September 2014, there are now 4 identified wrecks on the bottom of White Bear Lake. Of these wrecks, 3 of them now have Minnesota archaeological site numbers. MHM will fill out site forms for the remaining wreck and for other wrecks identified in the future, when appropriate. Further, 4 other types of maritime sites have been located on the bottom of White Bear Lake, 3

²Potash is used as a fertilizer and is primarily comprised of potassium and sodium chlorides.

³The study was conducted by the USGS with the cooperation of the White Bear Lake Conservation District, Minnesota Pollution Control Agency, Minnesota Department of Natural Resources, Minnesota Board of Water and Soil Resources, Twin Cities Metropolitan Council, and the Groundwater/Surface-Water Interaction Partners.

⁴The USGS project concentrated on sediment temperatures and composition, not build-up over time that MHM is interested in studying.

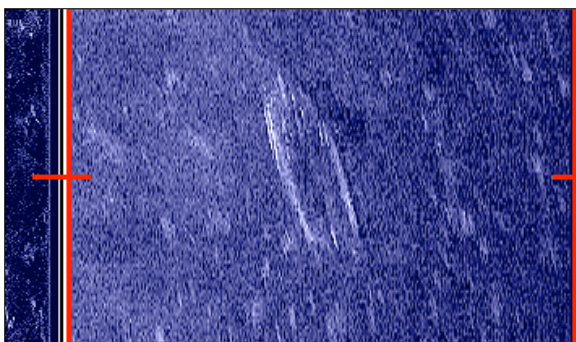
of the anomalies were large rocks that cast significant acoustical shadows, and 15 were false sonar returns. The data gathered during the WBLNA-1 Project will be utilized in all future underwater archaeological projects conducted at White Bear Lake.

Judge's Boat Wreck, 21-WA-113 (Anomaly 29)

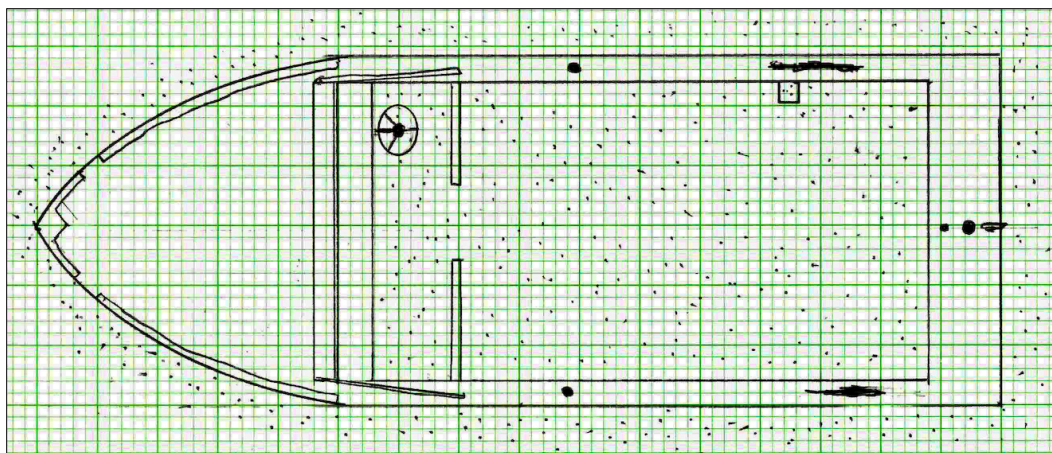
The initial sonar image of Anomaly 29 recorded during the WBLS Project was inconclusive as to its nature since MHM's research boat traveled directly over it. In mid-August 2014 MHM archaeologists and volunteers confirmed that Anomaly 29 is a wooden wreck and later that month, MHM re-scanned the site to obtain a clearer sonar image of the site. Through research at the White Bear Lake Area Historical Society and interviews with White Bear Lake residents, MHM determined she is a Judge's Boat from the White Bear Yacht Club. Anomaly 29 is 16.00 feet long, 5.50 feet in the beam, she has a hard chine, and a flat bottom. Some white paint survives on the outer hull, and a partial "W B Y [C]" (White Bear Yacht Club) in black paint is visible on her transom. Further, on the starboard and port bow there are number '9' decals affixed to the hull. A large custom-made three-sided windshield held together by a wooden frame, added to the boat by the WBYC to replace a much smaller windshield, is nearly intact; only the starboard side aft vertical section of the wooden frame is missing. The wreck's bow is closed, she has a metal plate reinforcement on her stempost, and a thick wooden reinforcement on the foredeck. Two chocks have been hewn out of a raised log rail, an addition to the boat after her manufacture. This log rail acts as a splash rail and tapers aft, ending near the front of the windshield on both the starboard and port gunwales. The small WBYC sailboat regatta starter's cannon would have been attached to the foredeck (Sara Markoe Hanson, personal communication, September 9, 2014). The wreck's steering wheel is intact and the forward seats are in place⁵, but her dashboard instruments are gone. Both the starboard and port gunwales amidships have round holes bored into them to receive flagpoles and the inner starboard gunwale has a square bracket attached for the same purpose. The gunwale fore, aft, and at the attachment point of the square bracket has severely cracked, damage that occurred during the boat's working life. A similar crack is present on the port side gunwale aft of the flagpole hole. MHM contends the damage to both gunwales occurred prior to 21-WA-113's sinking. The decked transom is intact and a stern lifting eye is attached to a separate block of wood imbedded in the deck. This attribute is a repair to the lifting eye's attachment point; originally the eye was affixed directly to the deck. The center and port side transom has evidence of dry rot and the stern bench has been removed. Because of the missing bench, the area below the stern decking could be accessed and it was determined that the gas tank has been removed. The engine and square engine cover – colloquially referred to as a 'dog house' – are both missing. In their place behind the seats in the open hull, many large rocks fill the main section on the deck. A layer of sediment measuring 15.60 inches deep from the deck covers the rocks, filling the hull to within a few inches of the gunwale. The lake bottom at the wreck site is very soft, with feet of silt lying on top of the lakebed, the disturbance of which causes decreased visibility. The disturbed sediment remains in the water column for a substantial amount

⁵Originally the two seats were comprised of one padded bench as seen in photos of 1942-1943 Chris Craft Deluxe Utility boats, but this attribute was modified during the life of the boat.

of time, not clearing quickly. This fact suggests that water moves through this area of the lake slowly, and accounts for the thick silt that drops out of the water column in this area.



A sonar signature of the Judge's Boat Wreck (21-WA-113) The acoustical shadow cast to the starboard side of the wreck is the large windshield that still stands.



A sketch of the Judge's Boat Wreck (21-WA-113). Her bow is pointing to the north (by Christopher Olson, MHM).



Above: The port side bow chock cut into the log rail (by Mark Slick).

Left: The port side reinforced bow and the chock cut into the log rail (by Kelly Nehowig).



The port side of the wreck amidships showing where the windshield meets the gunwale and the log rail ends (by Mark Slick).



The port side top corner of the windshield frame with the port side glass (by Kelly Nehowig).



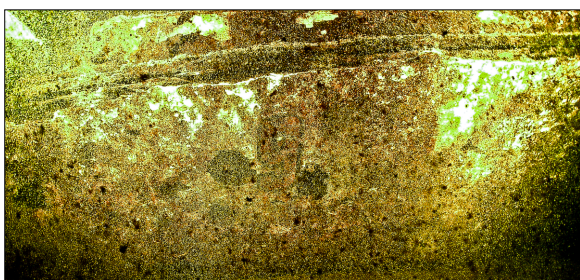
A hole in the amidships port side gunwale that held the flagpole for the Judge's Boat flag (by Kelly Nehowig).



A metal bracket that held a large pole (by Mark Slick).

From MHM's initial investigations, it was determined that the wreck is a utility model constructed in the 1940s and that she worked as one of the White Bear Yacht Club's Judge's Boat. MHM located a postcard of an early 20th Century WBYC Judge's Boat during the WBLS Project research, a vessel with a large "8" painted on the bow and a bullhorn onboard. This image, even before the letters "W B Y" were seen on the wreck's transom, suggested to MHM that 21-WA-113 is a mid-20th Century WBYC Judge's Boat because of the lone number "9" on both sides of the hull. The succession of the numbers from "8" to "9" suggests each new WBYC Judge's Boat was given a distinct

hull number. Also, the lack of a Minnesota alphanumeric registration number on the wreck's bow confirms she was not on the waters of White Bear Lake after July 1, 1959 – the date motorized vessels were required to display their assigned number on both sides of their hull. Further, several other attributes suggested to MHM that she was a Judge's Boat including the flagpole holders, reinforced bow, and modified windshield. Much of the data collected by MHM indicates the boat was intentionally scuttled, likely because the boat's wood was breaking down from age and use, making her unsafe on the water. The evidence cited above – the removal of her engine, gas tank, dashboard instruments, and the filling of her hull with heavy rocks – are indicators of scuttling. Further, White Bear Lake resident Mike Parenteau – who remembered the boat while she was on the water – contacted several WBYC members by phone in MHM's presence and they also remembered 21-WA-113 during her working life. The vessel's original owner was Vic Hauser, one of the Commodores of the WYBC. It was confirmed by three people that the Judge's Boat was taken out of commission in 1959, replaced by a Lyman Boat Works clinker-built wooden vessel. At that point, WBYC officials tasked two men to dispose of the old boat. These men removed her Chris Craft engine for use in one of their 1948 Chris Craft boats, filled her with rocks, and scuttled her in White Bear Lake in 1960 (Mike Parenteau, personal communication, September 9, 2014). The presence of a Chris Craft engine confirms that the Judge's Boat is a Chris Craft brand, and MHM contends she is a 1941-1942 Deluxe Utility. Her engine was a 60 HP 'Chris Craft B' and the wreck is one of 228 boats of this model constructed. This model was constructed of mahogany and when manufactured, had a red bottom, was white at the waterline with no paint on the outer hull. She has a hard chine with a V-bottom. The front and back seats were comprised of upholstered benches, while the Judge's Boat Wreck's driver's and passenger's seats are split and made of slatted wood, a later modification (Conrad 2002, 11). Originally 21-WA-113 would have had step pads on the gunwales fore and aft and as indicated in photographs, she has a splash rail on both stern quarters. This attribute is not visible on the wreck since the splash rail is buried in sediment. MHM will use the amount of sediment built-up inside the Judge's Boat Wreck's hull for comparison when determining the sinking dates of other White Bear Lake wrecks because of her known sinking date of 1960. Sediment accumulated in 21-WA-113's hull at an average rate of .29 inches per year. MHM submitted an archaeological site form to the OSA in mid-September 2014 and acquired the Judge's Boat Wreck's site number at that time.



The Judge's Boat Wreck's number "9" on the port side (by Mark Slick).



An early WBYC Judge's Boat with a number "8" on her bow (Minnesota Historical Society, GV3.61Sr63, digitized by MHM).



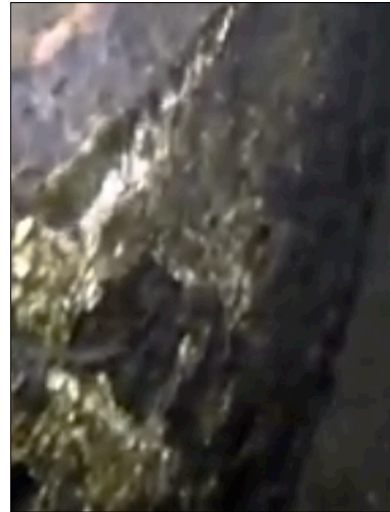
The starboard stern of the Judge's Boat Wreck (by Kelly Nehowig).



The stern deck with the lifting eye attached (by Mark Slick).



Above and Right: The "W B" and "B Y" on the wreck's transom (by Kelly Nehowig).



The Judge's Boat Wreck (21-WA-113) docked at the WBYC Sailor's Pavilion, constructed in 1939. The man in the Judge's Boat is Eugene Markoe (courtesy of James Warner through the White Bear Area Historical Society; Sara Markoe Hanson, personal communication, September 9, 2014).



The Judge's Boat Wreck on the water, over-seeing a sailing regatta. Eugene Markoe is tending the small starter's cannon at the bow (courtesy James Warner through the White Bear Area Historical Society).



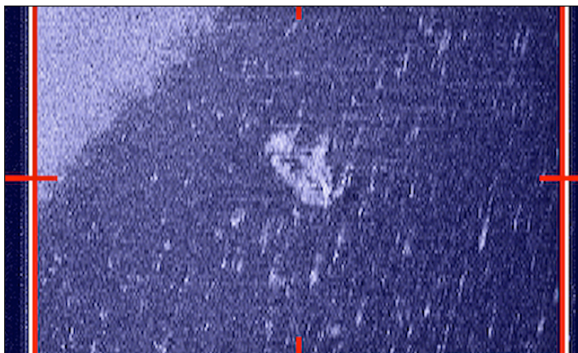
A 1941-1942 Chris Craft Deluxe Utility model as manufactured. The Judge's Boat Wreck was modified by her first owner Vic Hauser or the WBYC in several ways: the addition of the bow log rail and a reinforced stempost; the attachment of the starter's cannon; a larger windshield; the step pads were removed; flagpole holes and a pole bracked were added to the gunwale; the front bench was replaced by two wooden slat seats; the stern bench was replaced by a wooden slat bench; the stern eye was reinforced with an extra wooden block; and she was painted white with the number "9" affixed to her hull (Mariner's Museum PI 1995).



This clinker-built Lyman boat replaced the Chris Craft Judge's Boat in 1959 (courtesy of the White Bear Area Historical Society, P2009.003.019).

Steel Boat Wreck 1, 21-WA-114 (Anomaly 2)

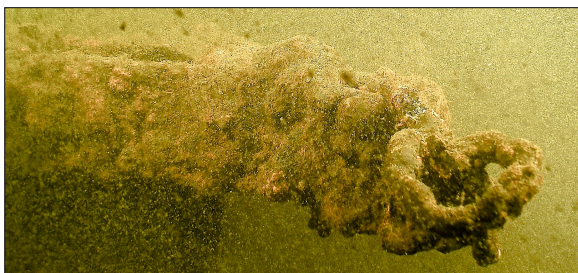
When MHM recorded a sonar image of Anomaly 2 during the WBLS Project, it was determined immediately that she was a wreck. MHM confirmed that Anomaly 2 is a small steel wreck in mid-August 2014. The wreck is 13.70 feet long overall, the hull is 13.00 feet long, she is 4.70 feet in the beam, has rounded bilges, and a flat bottom. A metal strap extends off the bow rub rail on starboard and port that would serve as an eye for lifting or towing. This strap has a shackle attached to it that would function as a connection point for a chain or rope line. A wooden rub rail, painted red, is attached to the outer hull by bolts. This beam, along with a wooden inner hull stringer, sandwich the top edge of the outer hull and comprise the gunwale. Both stern corners have triangular-shaped metal supports attached to them. The stern gunwale between them is reinforced with wood to accommodate an outboard motor. Steel oarlocks are attached to the gunwale stringer amidships on both sides of the hull and a series of thin channel frames line the inner hull. Two of these frames are located on the stern inner starboard and port quarters. Toward the bow, forward of the oarlocks, a wooden clamp (a longitudinal beam that would have supported a wooden seat that is no longer extant) is attached to the inner hull. This oarlock and seat arrangement would be expected since a rower or rowers would need the seat in this position to effectively row the boat. When constructed, at least one more seat was likely part of the boat's design. Since Anomaly 2 was constructed to carry an outboard motor, she would have been required to obtain a registration number from the State. However, the wreck never carried a Minnesota registration number, indicating she sank prior to July 1, 1959.



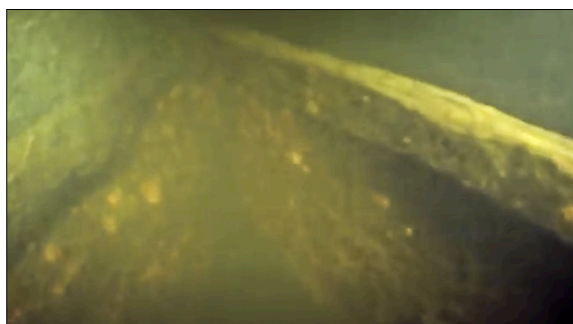
A sonar image of the Steel Boat Wreck 1 (21-WA-114).



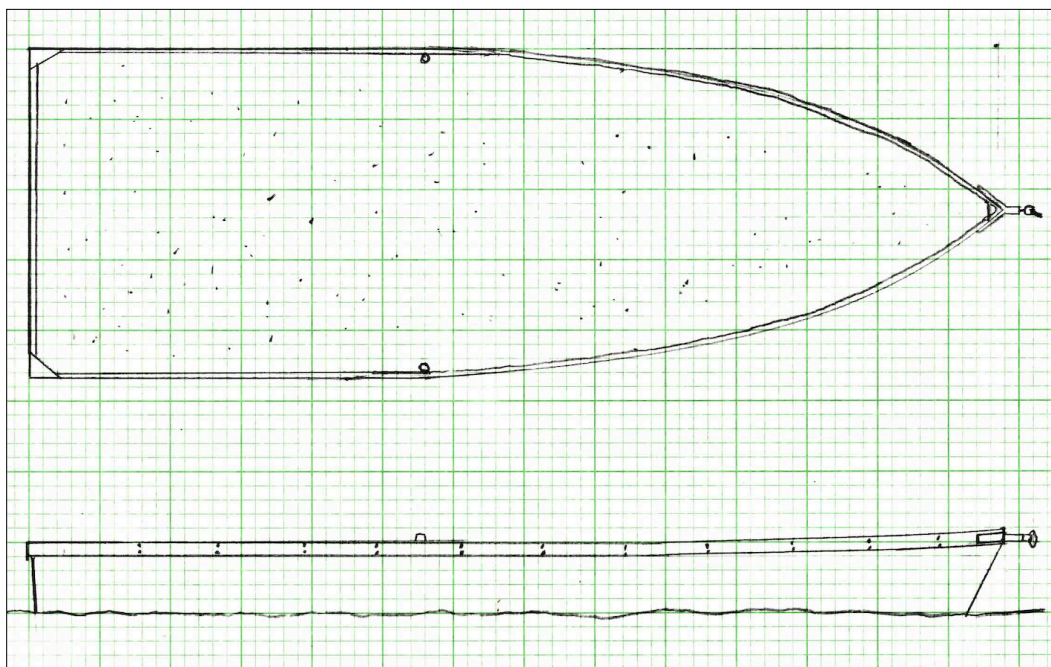
The Steel Boat Wreck 1 showing a metal strap extending off the bow for towing or lifting (by Mark Slick).



The shackle attached to the metal strap of 21-WA-114 (by Mark Slick).



The bow of the wreck viewed from inside showing the wooden gunwale stringer (by Mark Slick).



A sketch of the Steel Boat Wreck 1 (21-WA-114). Her bow is pointing to the northwest (by Christopher Olson, MHM).



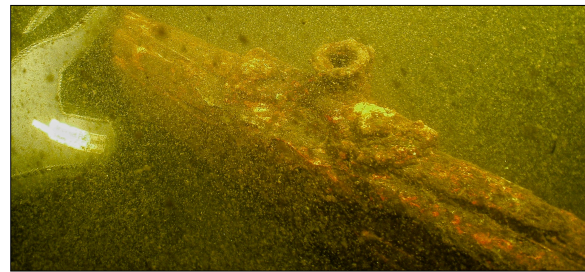
The starboard side stern reinforcement (by Mark Slick).



A starboard side channel frame attached to the inner hull (by Mark Slick).



The outer hull of the Steel Boat Wreck 1 with some red paint on the wooden gunwale (by Mark Slick).



An oarlock attached to the port side of the wreck, surrounded by the gunwale stringer, painted red like the gunwale (by Mark Slick).

To determine the approximate construction date of the Steel Boat Wreck 1, MHM has researched the history of steel small craft construction, a topic that goes back to 1894. One of the earliest manufacturers of small steel boats was the W. H. Mullins Company of Salem, OH. By 1905, the Mullins Company was constructing boats to carry motors and by the mid-1910s, small Mullins steel boats were designed to carry outboard motors on their transom. One model, 'The Outboard Special', has a wooden rub rail and gunwale stringers that suggest the construction of the Steel Boat Wreck 1. MHM does not contend that Anomaly 2 is a Mullins craft, but the similarities to the early steel boats from this company suggest that 21-WA-114 was constructed between 1915 and 1940, prior to World War II. MHM suggests she was constructed closer to 1915, however, due to the utilitarian nature of the design and the lack of watertight compartments⁶. Mullins in particular marketed their boats as the safest on the water, claiming "Mullins steel boats can't sink", and their designs included airtight compartments (W. H. Mullins Company 1916). The Pioneer Manufacturing Company of Indiana also constructed small early steel boats. One model from the mid-1920s resembles Anomaly 2, with

⁶Although it is possible that Anomaly 2 once had a bow deck that, along with a bulkhead, would contain air and constitute an airtight compartment, MHM is confident that the boat was not constructed in this manner.

small differences in design (Hibbard, Spencer, Bartlett & Co. 1927, 2058).

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Mullins Outboard Special 14-foot steel boat will add about 50% to the efficiency of any detachable motor.

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Above: The W. H. Mullins Co. was a prolific builder of early small steel outboard boats, similar to the Steel Boat Wreck 1. The Mullins Outboard Special had wooden gunwales like 21-WA-114 and could carry one of the earliest outboard motors constructed (W. H. Mullins Co. 1916).

Right: The W. H. Mullins Co. boasted about the 'unsinkability' of their steel watercraft for decades (W. H. Mullins Co. 1917).

STEEL ROW BOATS



Fit bottom boat, designed for fishing, cottages and summer resorts. Note the long lines and deep body. Rides high, has lies easy, roomy.

EQUIPMENT

One pair copper tipped oars painted or varnished, false bottom of light cedar, anchor pulleys and wood rail inside boat, furnished with each boat. Made of 20 gauge galvanized sheet steel. Wood seats over the air chambers, seams are double locked, can't leak, large air chambers in boat give the maximum of safety.

OUT BOARD MOTOR

Each boat fitted for attaching an out board motor. Stern of boat is especially reinforced for this purpose. The design of the boat makes its use with an out board motor very satisfactory.

Boats are painted battleship gray and trimmed in green.

Model	F12	F13	F14	F15	F16	F17
Length, ft.	12	13	14	15	16	17
Depth, in.	15	16	15	16	15	15
Width, beam, in.	44	45	46	46	47	48
Width, stern, in.	24	25	25	26	27	28
No. of seats	3	3	3	4	4	4
Shipping w't each, lbs.	200	215	230	250	260	300
Each	\$68.90*	\$88.90*	\$93.75*	\$96.85*	\$102.00*	\$107.30*

LIVE BOXES AND FISH WELLS

One of the most convenient accessories for a fisherman is a live box in a boat. This is placed under one of the seats, can be divided into two compartments where desired, one for live bait and one for fish. Holes in the bottom of the box are so arranged that the motion of the boat causes a continuous flow of fresh water in the boxes. No dead minnows, fish always fresh when you reach your cottage.....each \$17.20

The Pioneer steel boat could be used as a row boat or it could accommodate an outboard motor. Pioneer steel boats were sold through catalogs (Hibbard, Spencer, Bartlett & Co. 1927, 2058).

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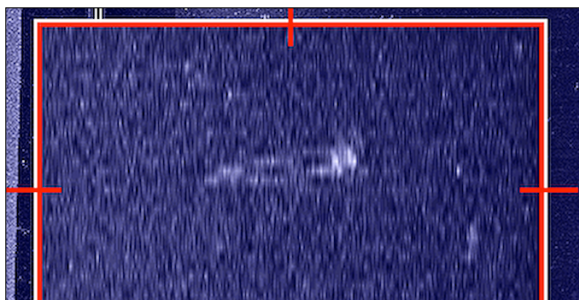


As mentioned above, MHM is certain the vessel sank prior to July 1, 1959 due to the lack of a registration number on her hull. To establish a probable sinking date, MHM must consider the amount of sediment build-up in the wreck's open hull. The Steel Boat Wreck 1 is filled with 7.20 inches of sediment and the bottom of the lake in this area is medium soft. When compared to the lake bottom at the site of the Judge's Boat Wreck, it is harder and the water column clears more quickly after disturbance. These facts indicate that the water moves more quickly through this area than at the 21-WA-113 site and sediment settles out of the water column more slowly. Assuming a 1959 sinking date, the average amount of sediment build-up per year would be .13 inches. However, due to the more primitive design of the wreck, it is probable that she sank around 1940,

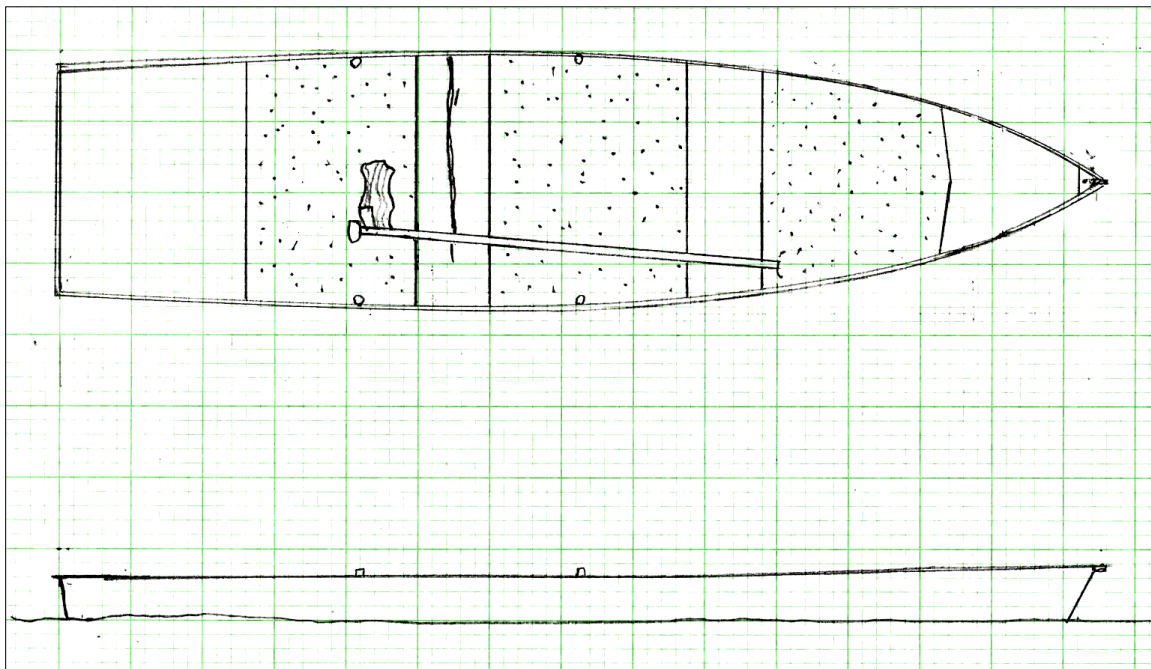
suggesting a silt accumulation of .10 inches per year. Since the difference between these two numbers is negligible – and the only hard data to suggest an actual disposition date for the wreck on the lake bottom is the lack of a registration number – MHM will assume a 1959 sinking date. Site 21-WA-114 can be used as a general indicator for this area of the lake in regards to sinking dates and sediment build-up rates in consideration of wrecks identified in the future. MHM contends the Steel Boat Wreck 1 was probably scuttled due to age and probable weakening of the hull through rusting. MHM submitted an archaeological site form to the OSA in late-September 2014 and acquired the Steel Boat Wreck 1's site number at that time.

Steel Boat Wreck 2, 21-WA-115 (Anomaly 10)

The sonar image of Anomaly 10, recorded during the WBLs Project, clearly indicated that she was a wreck. In mid-August 2014, MHM confirmed that Anomaly 10 is a small steel wreck. The wreck is 14.00 feet long, 3.70 feet in the beam, has rounded bilges, a flat bottom, and no registration number. A metal anchor pulley extends off the bow and is attached just under an extruded steel caprail, above which a triangular bow deck plate is attached to the gunwale. The Steel Boat Wreck 2 has fore and aft air chambers for flotation and that also serve as seats, two wooden seats amidships, and two sets of oarlocks. The stern flotation chamber/seat is exceptionally long, protruding from the stern toward the bow significantly. There are a series of light channel frames reinforcing the inner hull, and there is a transom board attached to the stern for the addition of an outboard motor. The stern corners are sharp and utilitarian, with no castings or handles for easier carrying. On the starboard side transom, a small hole has worn through the metal just under the gunwale. On the port side forward, a hole has worn through the steel near the gunwale, a possible indicator that the boat was scuttled after the breakdown of the hull's metal after long years of use. An intrusive 'modern' mast light with an American flag pennant lies in the middle of the wreck, having fallen from a passing boat somewhat recently. MHM contends 21-WA-115 was constructed before World War II due to her steel hull; by the mid-1940s, small personal watercraft were constructed of aluminum. However, MHM asserts she was built many years after the Steel Boat Wreck 2 due to the lack of a wooden rub rail and gunwale stringer (an older attribute), the presence of an extruded steel caprail (a more technologically advanced attribute), and airtight fore and aft compartments. As indicated above, early Mullins steel boats were fitted with airtight flotation sections. But, MHM contends Anomaly 10 is not a Mullins brand vessel, but a locally constructed boat reflecting attributes commonly incorporated into small steel boats by the 1910s.



A sonar image of the Steel Boat Wreck 2 (21-WA-115).



A sketch of the Steel Boat Wreck 2 (21-WA-115). Her bow is pointing to the west (by Christopher Olson, MHM).



The bow of the Steel Boat Wreck 2 (by Mark Slick).



The port side forward of the Steel Boat Wreck 2, showing the front seat (by Mark Slick).



The wreck's rear wooden seat (by Mark Slick).



The stern gunwale with the outboard transom board (by Mark Slick).



An oarlock on the Steel Boat Wreck 2 (by Mark Slick).



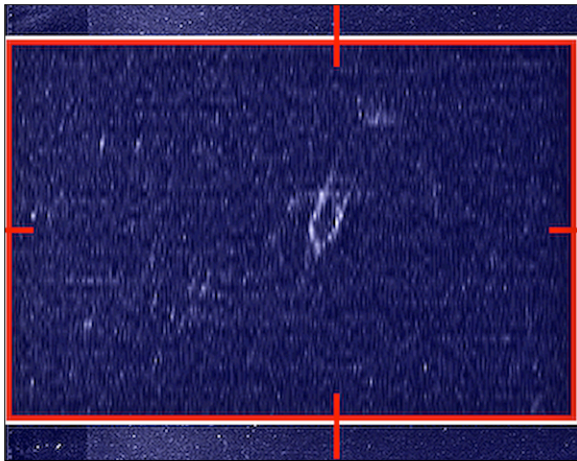
A channel frame near the wreck's gunwale (by Mark Slick).

Like the Steel Boat Wreck 1, the Steel Boat Wreck 2 sank before July 1, 1959 due to her lack of a registration number. Her hull contains 3 inches of sediment build-up in an area of medium soft bottom that clears somewhat quickly after disturbance. When compared to Anomaly 2, 21-WA-115 lies in an area where water moves through more quickly, and therefore less sediment falls out of the water column. Assuming a 1959 sinking date, silt build-up on Anomaly 10 averages .054 inches per year. MHM submitted an archaeological site form to the OSA in late September 2014 and acquired the Steel Boat Wreck 2's site number at that time.

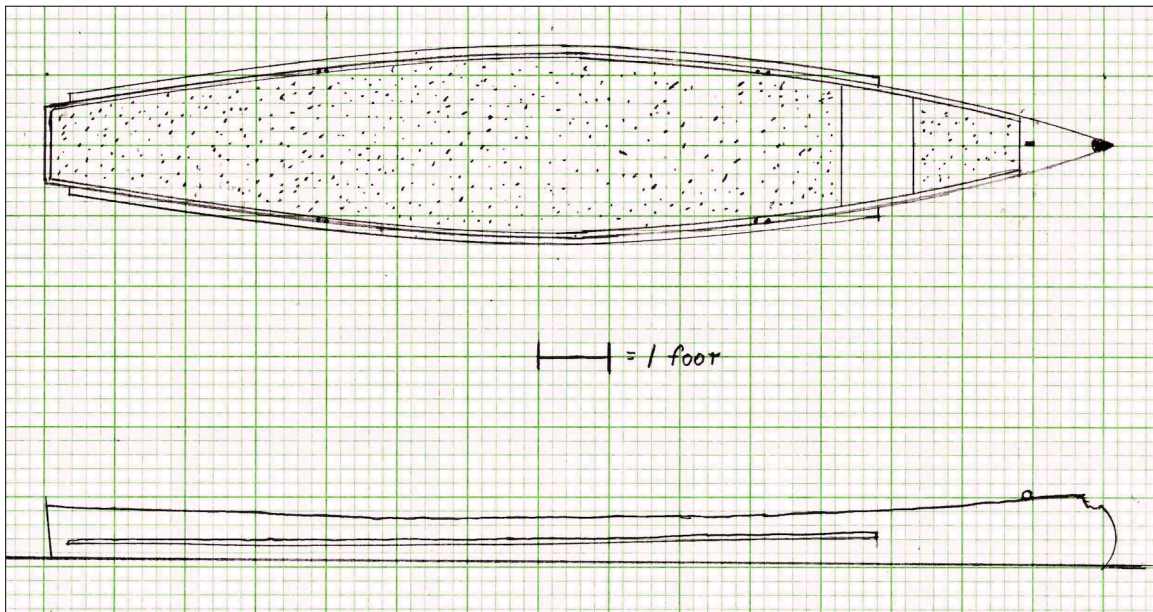
Aluminum Square Stern Canoe Wreck (Anomaly 12)

The sonar signature of Anomaly 12 allowed MHM to conclude she was a wreck during the WBLs Project and in mid-August 2014, MHM confirmed that she is an aluminum square stern canoe. The canoe is 15.00 feet long, 2.60 feet in the beam, the transom width is 1.00 foot, she has an enclosed bow that has sustained damage, large splash rails along most of the hull, and a flat bottom. The small bow deck is triangular with a raised section in the center, and the tip of the bow is missing. The splash rail is exceptionally hefty at the stern and is placed at the waterline, suggesting a bilge keel. It is applied to the hull and not formed by it, and its size and placement at the stern would not only help prevent water from splashing over the canoe's gunwale but would also provide stability like a bilge keel. Anomaly 12 had two thwarts attached to the gunwale, common to aluminum canoes for rigidity and ease of carrying; they are now missing but their attachment points are evident. The vessel has a substantial caprail that suggests heaviness, although the canoe will move if touched. Two lifting eyes or tie-down eyes are attached to the transom on the port and starboard gunwale, while a bow eye for the same function – with a small line still attached – is found at the aft end of the foredeck.

Just aft of the foredeck there is a seat that is mostly covered in silt. MHM contends the wreck had or has a seat toward the stern as well, considering the wreck's size. However, due to poor visibility, silt accumulation, and the presence of weeds growing inside the hull, it has not yet been confirmed. Anomaly 12 is primarily welded together, with rivets only evident as fasteners for the now-missing thwarts. On the port side bow a round yellow sticker with small illegible black letters is affixed to the hull and MHM contends this decal is the vessel's registration. Round yellow stickers were issued for non-motorized vessels in Minnesota in 1975 and 1980 (John Nordby, personal communication, September 26, 2014). The State required the licensure of non-motorized boats, canoes, and sailboats beginning in 1972 (*Mound-West Tonka Minnetonka Sun* 1972).



A sonar image of the Aluminum Square Stern Canoe Wreck (Anomaly 12), an unusual craft.



A sketch of Anomaly 12, the Aluminum Square Stern Canoe Wreck (by Christopher Olson, MHM).



The bow of the Anomaly 12 (by Mark Slick).



Damage to the canoe's bow (by Mark Slick).



The port side gunwale and front seat (by Mark Slick).



The starboard side splash rail amidships (by Mark Slick).



The starboard stern quarter of the Aluminum Square Stern Canoe Wreck where the splash rail is at its largest (by Mark Slick).



The starboard stern quarter and transom with a lifting or tie-down eye attached (by Mark Slick).



The narrow nature of the Aluminum Square Stern Canoe Wreck at the stern is evident in this image
(by Mark Slick)

The construction date and brand of Anomaly 12 is currently unknown. Many Alumacraft and Grumman square stern canoes, and other less well-known brands such as Michicraft and Aerocraft, had splash rails either formed from their hulls or affixed to the canoe's sides. The extreme size of the stern splash rail makes the wreck unique, and an extensive search of post-World War II canoe manufacturers catalogs and photographs has yet to produce results; nothing has been found yet that matches Anomaly 12. The area of the lake where the canoe lies is soft and the water column settles slowly after a disturbance, indicating that water moves slowly through this section. The hull of the Aluminum Square Stern Canoe lies on top of the lake bottom, not sunken into it. Further, an average of 3.00 inches of silt is contained inside the hull. This data, along with the use of round yellow State registration decals in 1975 and 1980 suggests the canoe's disposition on the bottom of the lake probably occurred in the mid to late 1980s. The wreck's design suggests she is older than the registration information allows and by the late 1980s, her metal might have become fatigued as indicated by the hole torn into the bow. Assuming a sinking date of 1989, an average of .12 inches of sediment built-up in the hull yearly. However, this disposition date is conjecture and without further research, cannot be proven at this time. MHM advocates returning to the wreck in the Spring when better visibility might allow the determination of the wreck's registration number. Anomaly 12 is classified as an historical cultural resource and is protected under the jurisdiction of the DNR.

Mast and Sail (Anomaly 28)

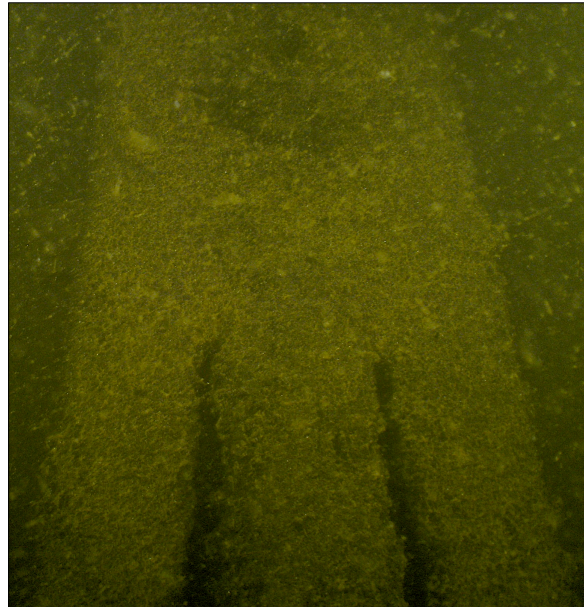
Anomaly 28's sonar signature suggested that it was a small boat. However, upon diving on the anomaly in mid-August 2014, it was determined that it was an aluminum mast with a white and blue sail attached, along with other pieces of cable and rigging. The mast is 18.50 feet long with fittings attached (including what appears to be a cheek block), is square in cross-section, and it has about a 5.00 inch diameter. The sail is lying flat on the bottom, covered in a layer of light sediment. A boom is lying partially underneath the sail and lying next to the mast is a bowsprit platform. There are numbers on the sail, but with the poor visibility because of the sediment layer, they could not be read. If the numbers on the sail can be deciphered, Anomaly 28 could be linked to an actual vessel that was probably connected to the White Bear Yacht Club. Currently the year of construction and the date of disposition of the mast and sail on the lake bottom remains unknown. Anomaly 28 is classified as an historical cultural resource and is

protected under the jurisdiction of the DNR.

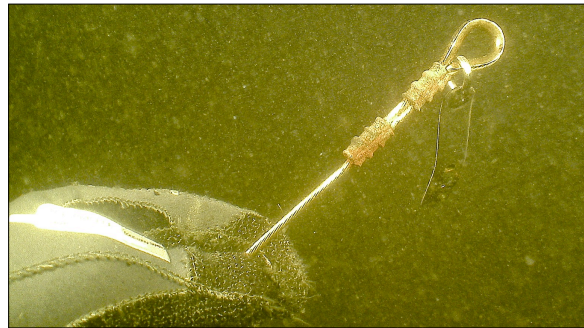


Above: A sonar image of Anomaly 28, the Mast and Sail.

Right: Part of Anomaly 28's bowsprit platform (by Mark Slick).



A probable cheek block on the mast of Anomaly 28 (by Mark Slick).



A galvanized steel cable with a loop (by Mark Slick).

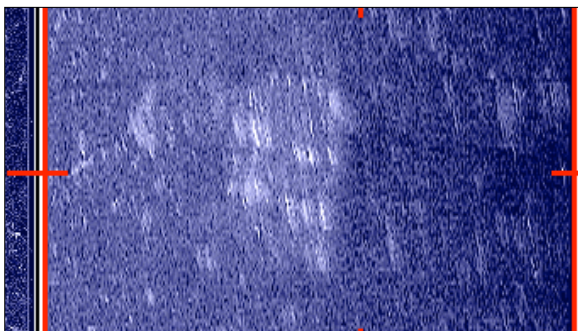
Pontoon (Anomaly 22)

The sonar signature of Anomaly 22 suggested it was a small wreck but in mid-August 2014, MHM determined it is a solitary metal pontoon. The pontoon lies in a section of White Bear Lake that is very soft and once disturbed, the visibility was horrible. No photographs were possible but the pontoon is 13.00 feet long, has a 1.30-foot diameter, much of the metal was degraded, and one end is pointed. Anomaly 22 is classified as an historical cultural resource and is protected under the jurisdiction of the DNR.

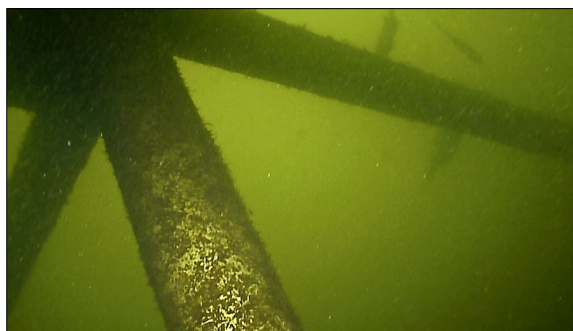
Boat Lift (Anomaly 46)

The sonar signature of Anomaly 46 recorded during the WBLS Project suggested a large object on the lake bottom and in mid-August 2014, MHM determined it is an overturned boat lift with an intact white canopy. The boat lift's frame support that is

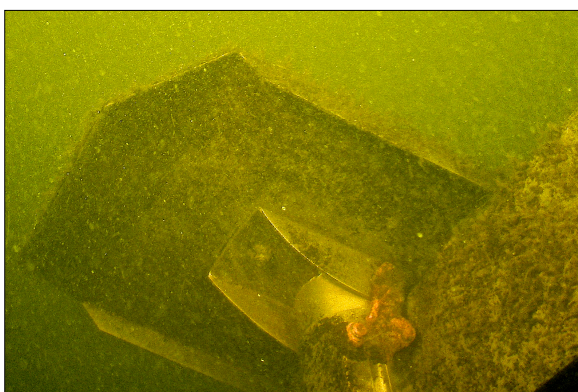
standing up in the water column measures 9.00 feet by 9.00 feet and stands 8.00 feet off the lake bottom. The canopy frame, lying on the lake bottom, measures 9.00 feet by 17.00 feet. The design of the lift indicates it is a vertical type with standard (short) boat bunks and a manually operated winch drive train to raise and lower a watercraft. Mr. Fred Espe of White Bear Lake approached MHM after a day of diving to inquire if we had located a boat lift in the lake. Mr. Espe confirmed that he had lost one the size of Anomaly 46 around 2004 during a strong storm. It was the third boat lift that had come lose from his dock over the years due to strong winds. During similar windstorms, boat lifts have been known to travel great distances over land and over water on White Bear Lake (Fred Espe, personal communication, September 2, 2014). If this boat lift is the one Mr. Espe lost, it traveled 1.10 miles, its canopy acting as a sail before it sank to the lake bottom. The area of the lake where the boat lift came to rest has a medium hard bottom with no gravel, and the water column cleared quickly after a disturbance. These conditions indicate that water moves swiftly through this section of the lake. Anomaly 46 is classified as an historical cultural resource and is protected under the jurisdiction of the DNR.⁷



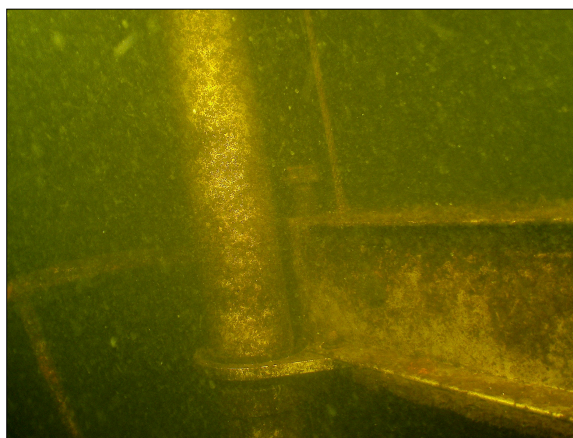
A sonar image of the Boat Lift (Anomaly 46).



A corner of the Boat Lift base in the water column (by Mark Slick).

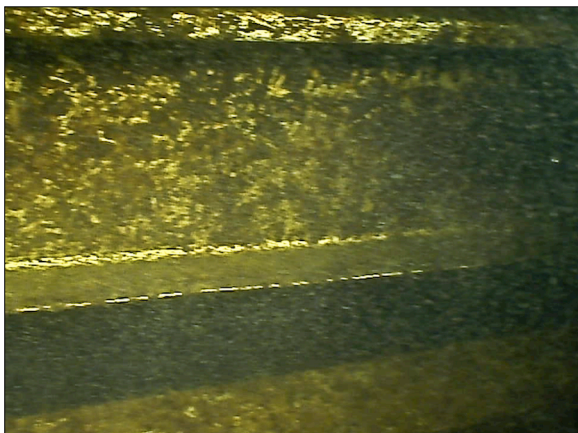


A Boat Lift sandpad (by Mark Slick).

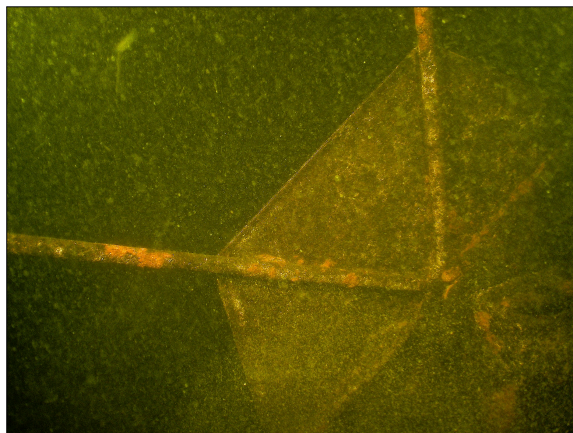


A section of the Boat Lift (by Mark Slick).

⁷Mr. Espe received an insurance payment for the loss of the boat lift and therefore, he no longer owns it. Since the insurance company did not retrieve the lift within 60 days of 'acquiring' it, Anomaly 46 became the property of the State at that time and it is now a piece of Minnesota maritime history and a submerged cultural resource.



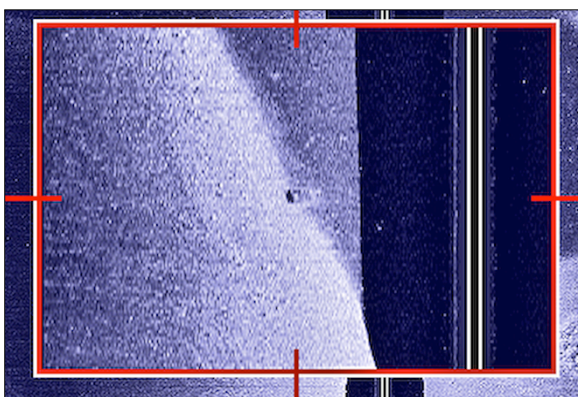
Part of the Boat Lift frame (by Mark Slick).



The crank wheel for the manual winch of Anomaly 46 (by Mark Slick).

Ice Fishing House (Anomaly 14)

The sonar signature of Anomaly 14 suggested it was a car, but in mid-August 2014, MHM determined it is a plywood ice fishing house. The house is in a fragmentary state and is constructed as a thin rectangular box that measures 6.50 feet by 3.00 feet and is 6.50 feet tall. Anomaly 14 lies on its side and on its bottom, two runners that would allow it to be dragged over the ice, are evident. The plywood sides are held together by sturdy beams, but much of the plywood itself is fragmented, soft, and easily damaged. The area where the fishing house lies is very hard-packed silty sand with a rock pile nearby. MHM contends the rock pile was the fisherman's 'spot' since it would attract fish, and the house went through the ice in the Spring melt. The consistency of the lake bottom in this area indicates that water rushes through very quickly, dropping little if any sediment out of the water column. MHM cannot determine the fishing house's construction date since there are no diagnostic attributes from which to determine this fact and there is no sediment build-up to estimate a sinking date. Anomaly 14 is classified as an historical cultural resource and is protected under the jurisdiction of the DNR.



A sonar image of the Ice Fishing House.



A corner of Anomaly 14 (by Kelly Nehowig).



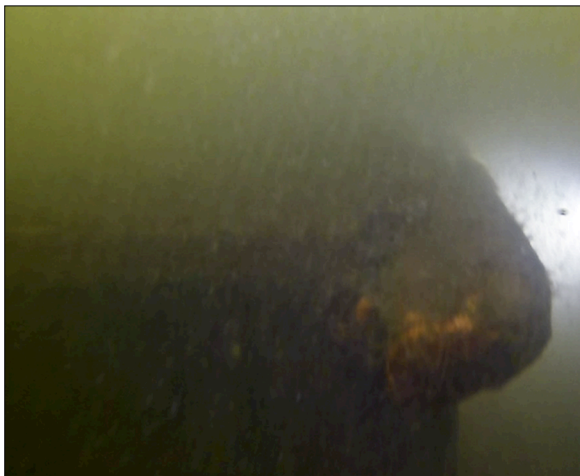
A corner of the Ice Fishing House (by Mark Slick).



A corner of Anomaly 14 showing extensive damage to its plywood sides (by Mark Slick).



A corner of the Ice Fishing House that shows the sturdy wooden frame under the plywood (by Kelly Nehowig).



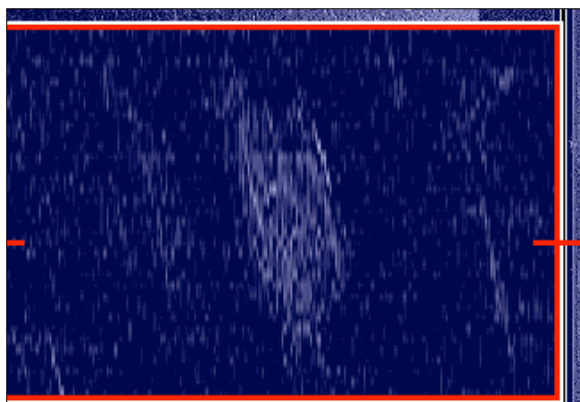
Left: The end of one of the sleds on the bottom of the Ice Fishing House (By Kelly Nehowig).

Anomalies 33, 34, 35

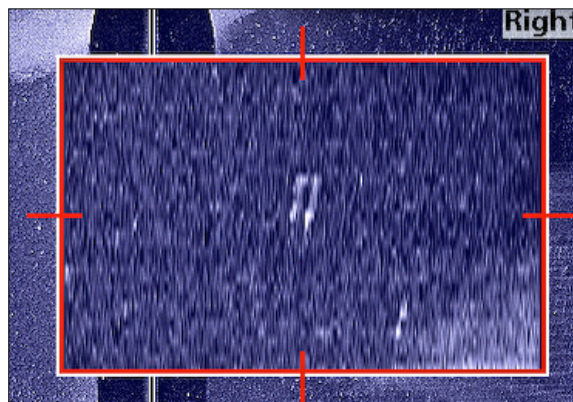
The sonar signatures of Anomalies 33, 34, and 35 suggested they might be small watercraft or other objects because they had substantial acoustical shadows. After diving on these anomalies during the WBLNA-1 Project, it has been determined that they are rocks.

Anomalies 5, 9, 23, 25, 31, 32, 44, 45, 45.1, 47, 50, 51, 52, 53, 55

The sonar images of Anomalies 5, 9, 23, 25, 31, 32, 44, 45, 45.1, 47, 50, 51, 52, 53, and 55 were suggestive of objects on the lake bottom, including wrecks. However, the 15 anomalies listed above were identified as false targets, being either contours or vegetation, some that cast significant acoustical shadows and some that did not. Anomaly 53, even though it did not cast an acoustical shadow, was strongly suggestive of an open cockpit runabout or utility boat. All that was found at this location was a soft lake bottom. However, MHM contends Anomaly 32 should be revisited in the Spring when better visibility is expected since the sonar signature is strongly suggestive of an overturned pontoon boat or other similar structure. As frustrating as false targets can be during a project, MHM can make use of the data collected during those dives, particularly the consistency of the lake bottom for future consideration for sediment build-up comparisons.



Although the sonar image Anomaly 53 suggests it is a wreck with a cockpit, it must a contour on the lake bottom.



MHM will return to Anomaly 32 at a time of better visibility in the future since its sonar signature strongly suggests a pontoon or other object.

Conclusion

The WBLNA-1 Project produced significant and interesting results, particularly identifying the first 4 wrecks on the bottom of White Bear Lake. It must be noted, however, that MHM is aware of at least 2 wrecks that were removed from the lake – illegal under State and Federal law – since the late 1950s. A group of people, for unknown reasons, decided to dredge out what they identified as the remains of the steamer *Dispatch*⁸ from Plantation Harbor in June 1957. Plantation Harbor is located where the current Lions Park is situated. In the process, the wood and metal remains were torn apart and it was reported that some of the wreckage was left in place. MHM cannot confirm whether the destroyed remains were the *Dispatch*, but if they were, an irreplaceable nautical archaeological resource was destroyed (*White Bear Press* 1957). Reportedly another wreck was illegally removed from the lake sometime in the last 3 decades and restored to operating condition. The wreck was a type of gasoline launch

⁸See MHM's *White Bear Lake Survey* for a history and a photograph of the *Dispatch*.

and was located in somewhat shallow water (Michael Parenteau, personal communication, September 9, 2014). Again, the destruction of the wreck described above, whether or not she was the *Dispatch*, and the removal of the launch wreck, were illegal. When inquiries are made to MHM stating "Where are the old wreck in White Bear Lake?", we can now report that at least 2 of the wreck sites have been destroyed.



The location of Plantation Harbor on White Bear Lake (United States Geological Survey 1967).

The identification of the Judge's Boat Wreck (21-WA-113) site is particularly significant for the maritime history of the White Bear Yacht Club. Judge's Boats have been necessary components of sailing regattas throughout the Club's history. The disposition of 21-WA-113 on the lake bottom in an act of scuttling fortunately preserved a piece of that history and she is now a unique nautical archaeological resource. The Steel Boat Wreck 1 (21-WA-114) and Steel Boat Wreck 2 (21-WA-115) are both unique in their design and construction, and they represent an early form of small metal watercraft construction. Building large boats and ships out of metal is a tradition dating back to the mid-1800s in the United States. However, the construction of small metal boats for personal use was not commonplace until the introduction of the use of aluminum after World War II. Although the W. H. Mullins Company specialized in steel boat creation beginning in 1894 and produced over 100,000 vessels over a 40 year period, these boats are little known; and the two small steel wrecks on the bottom of White Bear Lake are very likely not Mullins brand vessels (Dufresne 2001; Mullins Manufacturing Corporation 1934). The survival of two small steel watercraft on the bottom of White Bear Lake is unique and archaeologically significant. The Aluminum Square Stern Canoe (Anomaly 12), even as the 'newest' wreck so far identified on the bottom of White Bear Lake, poses a number of questions as to her origins and unique design. Further research into the manufacturers of 21-WA-114, 21-WA-115, and Anomaly 12 is warranted and as other small craft are discovered on the bottoms of Minnesota's lakes and rivers, this research will go beyond the boundaries of White Bear Lake.

The Boat Lift's (Anomaly 46) story is known and its long trip across nearly half of White Bear Lake indicates how powerful storms and how strong winds can be on the lake. This maritime site represents a common object seen on White Bear Lake and all others in Minnesota, but its story is interesting and will serve as a tangible example of the power of storms on wide-open lakes. The Boat Lift will be eligible to be considered as an archaeological site in 2054. The Mast and Sail (Anomaly 28), at this time, cannot be linked to a particular boat or race due to the bad visibility found during its documentation. Further research into the disposition of the Anomaly 28 on the lake bottom will occur during a future project. Likewise, the Pontoon (Anomaly 22) and Ice Fishing House (Anomaly 14) lack enough detail for MHM to make any conclusions about their date of manufacture or disposition on the lake bottom; however, this may change in the future.

The 2014 White Bear Lake Sediment Build-Up Study data provides a baseline for future archaeological projects conducted in the lake. The known disposition date of the Judge's Boat Wreck (1960) and Boat Lift (2004) are particularly useful in determining probable sinking dates for other anomalies located near-by and in similar conditions. Further, the approximate disposition dates for the Steel Boat Wreck 1 and Steel Boat Wreck 2 (pre-July 1, 1959), and the Aluminum Square Stern Canoe (probably post-1980) will enhance data collected in the future in those areas.

The diversity of nautical, maritime, and underwater sites so far identified in White Bear Lake are tangible examples of the rich maritime history of the area. Through research, diving on wrecks and anomalies to collect pertinent data, and ensuring that the collected information is accessible by the public, MHM will continue to investigate White Bear Lake's submerged cultural resources into the future. MHM re-examined the recorded sonar footage from the WBLS Project using knowledge gained from the comparison of anomalies that have proven to be wrecks or other submerged cultural resources in Lake Minnetonka. Over 50 more anomalies were identified from this re-study of the White Bear Lake sonar footage, and another review of the data is planned. The results of the WBLNA-1 Project summarized above is connected to all the work that came before and will come after its completion. However, a 1997 maritime history research project of the potential for shipwreck sites that might exist in Minnesota's lakes (Hall, Birk, and Newell 1997) did not include White Bear Lake as part of the study area. Therefore, the WBLS and WBLNA-1 Projects, and subsequent dive reconnaissance projects related to White Bear Lake, represent original research designed and implemented by MHM. The sites identified and documented now and in the future will be considered for National Register of Historic Places nomination when it is considered appropriate.

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